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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/690,401	10/20/2003	Benjamin Jay Diamant	60963-0015	5943
24341 7590 12/12/2007 MORGAN, LEWIS & BOCKIUS, LLP. 2 PALO ALTO SQUARE 3000 EL CAMINO REAL PALO ALTO, CA 94306			EXAMINER TRUONG, CAM Y T	
			ART UNIT 2162	PAPER NUMBER
			MAIL DATE 12/12/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Interview Summary

Application No.

10/690,401

Applicant(s)

DIAMENT, BENJAMIN JAY

Examiner

Cam Y T. Truong

Art Unit

2162

All participants (applicant, applicant's representative, PTO personnel):

(1) Cam Y T. Truong.

(3) Joshua Olion (Attorney).

(2) Gary Williams (Attorney).

(4) \_\_\_\_\_.

Date of Interview: 07 December 2007.

Type: a) ☒ Telephonic b) ☐ Video Conference  
c) ☐ Personal [copy given to: 1) ☐ applicant 2) ☐ applicant's representative]

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☐ No.

If Yes, brief description: \_\_\_\_\_.

Claim(s) discussed: 1.

Identification of prior art discussed: \_\_\_\_\_.

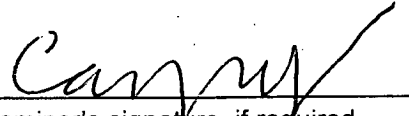
Agreement with respect to the claims f) ☐ was reached. g) ☒ was not reached. h) ☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: Applicant argued that Burrows did not teach logarithm of a boundary number. Burrows teaches using log.sub.2N, where N is the number of possible range-based integer values to be encoded (paragraph 0319). Log. sub.2 is represented as logarithm. N is represented as a boundary number. Examiner will further consider the cited art when receiving applicant's response to the office action.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

  
Examiner's signature, if required

Fax: 571-273-14042

PTOL-413A (06-07)  
Approved for use through 06/30/2007. OMB 0851-0031  
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

## Applicant Initiated Interview Request Form

Application No.: 10/690401 First Named Applicant: Benjamin Diamant  
 Examiner: Cam Truong Art Unit: 2162 Status of Application: Pending

## Tentative Participants:

(1) Gary Williams (2) Joshua Olson  
 (3) \_\_\_\_\_ (4) \_\_\_\_\_

Proposed Date of Interview: 12/7/07 Proposed Time: 1 (AM) (M)

## Type of Interview Requested:

(1) ☒ Telephonic (2) ☐ Personal (3) ☐ Video Conference

Exhibit To Be Shown or Demonstrated: ☐ YES

☒ NO

If yes, provide brief description: \_\_\_\_\_

## Issues To Be Discussed

Issues (Rej., Obj., etc)	Claim/ Fig. #	Prior	Discussed	Agreed	Not Agreed
(1) <u>Rejection/103</u>	<u>All Claims</u>	<u>Matsuda, Burrows</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(2) _____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(3) _____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(4) _____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐ Continuation Sheet Attached

## Brief Description of Arguments to be Presented:

See Draft Response, Attached

An interview was conducted on the above-identified application on \_\_\_\_\_

**NOTE:** This form should be completed by applicant and submitted to the examiner in advance of the interview (see MPEP § 713.01).

This application will not be delayed from issue because of applicant's failure to submit a written record of this interview. Therefore, applicant is advised to file a statement of the substance of this interview (37 CFR 1.133(b)) as soon as possible.

Gary S. Williams  
 Applicant/Applicant's Representative Signature

\_\_\_\_\_  
 Examiner/SPE Signature

Gary S. Williams  
 Typed/Printed Name of Applicant or Representative

31066  
 Registration Number, if applicable

This collection of information is required by 37 CFR 1.133. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 21 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

060963-0015

~~Electronically filed \*~~IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:	Benjamin Jay Diamant	Confirmation No.:	5943
Serial No.:	10/690,401	Art Unit:	2162
Filed:	October 20, 2003	Examiner:	Truong, Cam Y.T.
For:	<i>Number-Range Search System and Method</i>	Attorney Docket No.:	60963-0015-US
		Date:	December 3, 2007 ** DRAFT

DRAFT FOR DISCUSSION WITH EXAMINER – DO NOT FILE

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

The enclosed Amendment is in response to the Office Action dated September 14, 2007 for the above identified patent application.

The Commissioner is hereby authorized to charge any required fee(s) to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no. 60963-0015-US). A copy of this sheet is enclosed for such purpose.

## IN THE CLAIMS:

Rewrite the pending claims as follows:

1. (Previously presented) A method of querying number-range searches, comprising:  
receiving a number-range search query having a number range, wherein the number range includes a boundary number;  
generating an expression of numerical index terms based on the boundary number, wherein a respective numerical index term in the expression includes information indicative of an integral portion of a logarithm of the boundary number;  
searching a document index using the expression to identify one or more documents containing numbers that satisfy the expression; and  
returning a result in accordance with at least a subset of the identified documents.
2. (Cancelled)
3. (Previously presented) The method of claim 1, wherein at least one numerical index term in the expression includes information indicating that a specified digit is the last non-zero digit of a respective number.
4. (Previously presented) The method of claim 1, wherein at least one numerical index term in the expression includes information indicative of the sign of a respective number.
5. (Previously presented) The method of claim 1, wherein at least one numerical index term in the expression includes information indicative of a number type associated with a respective number range.
6. (Previously presented) The method of claim 1, wherein the expression includes a plurality of numerical index terms that each correspond to a single respective digit of a respective number.
- 7-12. (Cancelled)

13. (Previously presented) A computer-readable medium having stored thereon instructions which, when executed by a processor, cause the processor to perform the operations of:

receiving a number-range search query having a number range, wherein the number range includes a boundary number;

generating an expression of numerical index terms based on the boundary number, wherein a respective numerical index term in the expression includes information indicative of an integral portion of a logarithm of the boundary number;

searching a document index using the expression to identify one or more documents containing numbers that satisfy the expression; and

returning a result in accordance with at least a subset of the identified documents.

14. (Cancelled)

15. (Previously presented) The computer-readable medium of claim 13, wherein at least one numerical index term in the expression includes information indicating that a specified digit is the last non-zero digit of a respective number.

16. (Previously presented) The computer-readable medium of claim 13, wherein at least one numerical index term in the expression includes information indicative of the sign of a respective number.

17. (Previously presented) The computer-readable medium of claim 13, wherein at least one numerical index term in the expression includes information indicative of a number type associated with a respective number range.

18. (Previously presented) The computer-readable medium of claim 13, wherein the expression includes a plurality of numerical index terms that each correspond to a single respective digit of a respective number.

19-24. (Cancelled)

25. (Currently Amended) A search engine for querying number range searches, comprising:

one or more servers, each having one or more processors and memory, the one or more servers including:

a query encoder configured to receive a search query for a number range having a boundary number, wherein the query encoder is configured to generate an expression of numerical index terms based on the boundary number, and wherein a respective numerical index term in the expression includes information indicative of an integral portion of a logarithm of the boundary number; and

an index searcher server coupled to the query encoder and configured to search a document index using the expression to identify one or more documents containing numbers that satisfy the expression and to return a result in accordance with at least a subset of the identified documents. ~~and~~

~~returning a result in accordance with at least a subset of the identified documents.~~

26. (Cancelled)

27. (Previously presented) The search engine of claim 25, wherein at least one numerical index term in the expression includes information indicating that a specified digit is a last non-zero digit of a respective number.

28. (Previously presented) The search engine of claim 25, wherein at least one numerical index term in the expression includes information indicative of the sign of a respective number.

29. (Previously presented) The search engine of claim 25, wherein at least one numerical index term in the expression includes information indicative of a number type associated with a respective number range.

30. (Previously presented) The search engine of claim 25, wherein the expression includes a plurality of numerical index terms that each correspond to a single respective digit of a respective number.

31-36. (Cancelled)

37. (Previously presented) The method of claim 6, wherein a respective numerical index term in the expression represents a respective digit of a respective number in base 10.
38. (Previously presented) The method of claim 37, wherein the respective numerical index term in the expression corresponds to the position of the respective digit within the respective number.
39. (Previously presented) The method of claim 1, wherein the integral portion of the logarithm of a respective boundary number is an integral portion of a base 10 logarithm of the respective boundary number.
40. (Previously presented) The method of claim 1, wherein a respective numerical index term in the expression includes information indicative of a mantissa of a respective number.
41. (Previously presented) The computer-readable medium of claim 18, wherein a respective numerical index term in the expression represents a respective digit of a respective number in base 10.
42. (Previously presented) The computer-readable medium of claim 41, wherein the respective numerical index term in the expression corresponds to the position of the respective digit within the respective number.
43. (Previously presented) The computer-readable medium of claim 13, wherein the integral portion of the logarithm of a respective boundary number is an integral portion of a base 10 logarithm of the respective boundary number.
44. (Previously presented) The computer-readable medium of claim 13, wherein a respective numerical index term in the expression includes information indicative of a mantissa of a respective number.
45. (Previously presented) The search engine of claim 30, wherein a respective numerical index term in the expression represents a respective digit of a respective number in base 10.



46. (Previously presented) The search engine of claim 45, wherein the respective numerical index term in the expression corresponds to the position of the respective digit within the respective number.

47. (Previously presented) The search engine of claim 25, wherein the integral portion of the logarithm of a respective boundary number is an integral portion of a base 10 logarithm of the respective boundary number.

48. (Previously presented) The search engine of claim 25, wherein a respective numerical index term in the expression includes information indicative of a mantissa of a respective number.

*REMARKS*

This amendment responds to the Office Action mailed September 14, 2007. In the office action the Examiner:

- rejected claims 25-30 and 46-48 under 35 U.S.C. 101 as being directed to non-statutory subject matter;
- rejected claims 1, 3-4, 6, 13, 15, 16, 18, 25, 27-28, 30, 38, 40, 42, 44, 46, and 48 under 35 U.S.C. 103(a) as being unpatentable over Matsuda (US 2003/0225779) in view of Burrows (US 2004/0243569);
- rejected claims 5, 17 and 29 under 35 U.S.C. 103(a) as being unpatentable over Matsuda (US 2003/0225779) in view of Burrows (US 2004/0243569) and further in view of Lewak et al. (US 6,826,566);
- rejected claims 37, 39, 41, 43, 45 and 47 under 35 U.S.C. 103(a) as being unpatentable over Matsuda (US 2003/0225779) in view of Burrows (US 2004/0243569) and further in view of Beavin et al. (US 6,571,233); and
- rejected claims 37, 39, 41, 43, 45 and 47 under 35 U.S.C. 103(a) as being unpatentable over Matsuda (US 2003/0225779) in view of Burrows (US 2004/0243569) and further in view of Rajasekaran et al. (US 7,020,782).

After entry of this amendment, the pending claims are: claims 1, 3-6, 13, 15-18, 25, 27-30, and 37-48 (27 claims, 3 of which are independent claims).

*Claim Amendments*

Independent Claim 25 has been amended to clarify that the "search engine for querying number range searches" is a patentable apparatus comprising "one or more servers, each having one or more processors and memory." These amendments are supported by at least Figure 1 and Figure 11, and the accompanying text in the specification.

*Rejection of Claims Under 35 U.S.C. § 101*

The Examiner has rejected Claims 25-30 and 46-48 as embodying an abstract idea and thus not being patentable subject matter. The amendments to independent Claim 25 resolve this issue. The Applicant respectfully requests that the Examiner withdraw the rejections to claims 25-30 and 46-48 under 35 U.S.C. 101.

Rejection of Claims Under 35 U.S.C. § 103(a)

The Examiner has rejected the claims in view of at least *Matsuda* and *Burrows*. The Applicant respectfully contends that these references, when combined, do not teach or suggest the claimed invention. As the Applicant argued in the response to the last office action, neither *Burrows* nor *Matsuda* teach generating:

an expression of numerical index terms based on the boundary number... wherein a respective numerical index term in the expression includes information indicative of an integral portion of a logarithm of the boundary number;  
(Claims 1, 13 and 25, emphasis added).

The Examiner concedes that “*Matsuda* does not explicitly teach the claimed limitation ‘wherein a respective numerical index term in the expression includes information indicative of an integral portion of a logarithm of the boundary number.’” (Office action dated 9/14/07, page 8, paragraph 5). Likewise, *Burrows* does not teach the above claimed limitation.

In particular, *Burrows* does not contain any teaching that suggests calculating “a logarithm of the boundary number.” The Examiner cites several paragraphs of *Burrows* (Column 25, line 10 through Column 26, line 13), which contain only two references to logarithms:

The number of levels needed to encode a range of N integers, with doubling of sizes, is a function of  $\log_2 N$ , where N is the number of possible range-based integer values to be encoded.

(*Burrows*, column 25, lines 37-40, emphasis added)

With  $\log_2$  based encoding at most  $2L-1$  metawords need to be searched if L levels are used for the expression of the range-based values.

(*Burrows*, column 26, lines 6-9, emphasis added)

The “ $\log_2$  based encoding” referred to by *Burrows* in Column 26 is clearly referring to the discussion in Column 25, where *Burrows* discusses the “number of levels needed to encode a range of N integers.” Furthermore, the discussion in Column 25 clearly indicates that *Burrows* is teaching the calculation of  $\log_2 N$  (i.e., the logarithm, base 2 of N), where “N is the number of possible range-based integer values to be encoded.” N is clearly not a boundary number, rather it is a measure of the size of the range. Thus, *Burrows* is not calculating “a logarithm of the boundary number,” and cannot teach the above cited limitation, present in all independent claims. For at least this reason, the claimed invention is

not anticipated by *Matsuda* and *Burrows* and the Applicant respectfully requests that the Examiner withdraw the rejections to all pending claims under 17 U.S.C. 130(a).

Furthermore, as described in greater detail the Applicant's response to the Office Action dated 5/18/07, neither *Burrows* nor *Matsuda* teaches the calculation of a logarithm as an intrinsic part of the search process. *Matsuda* does not discuss calculating logarithms, and *Burrows* discusses calculating logarithms solely for the purpose of extrinsic evaluation of the computational characteristics of "Range-Based Metaword" encoding. In contrast, the claimed invention teaches calculating logarithms as an intrinsic part of the search process (i.e., calculating the logarithm of a number either to represent a number in a document or to create a search query expression). For at least this reason, the claimed invention is not anticipated by *Matsuda* and *Burrows* and the Applicant respectfully requests that the Examiner withdraw the rejections to all pending claims under 17 U.S.C. 130(a).

In light of the above amendments and remarks, the Applicant respectfully requests that the Examiner reconsider this application with a view towards allowance. The Examiner is invited to call the undersigned attorney at (650) 843-4000, if a telephone call could help resolve any remaining items.

Respectfully submitted,

Date: \_\_\_\_\_

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31,066  
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